



PDA Testing Services - Dynamic Testing of Helical and Micropiles

GRL Engineers performs dynamic testing on helical piles and micropiles by applying a limited number of impacts to the pile with an appropriately sized drop hammer and taking strain and acceleration measurements. This method is similar to what is used during Dynamic Load Testing on other types of deep foundations. Micropiles have small diameters, are built with high strength cement grout, and are encased with high strength steel casing. Helical piles typically have a central steel shaft and high strength steel helix plates that serve as load bearing elements.

Quality control of helical piles, commonly consists of measuring torque during installation, and performing static load test to correlate torque and capacity relationships. Using high strain dynamic load testing allows for quick development of load versus displacement curves to evaluate pile capacity.

Test Procedure

In Dynamic Pile Monitoring, strain transducers and accelerometers are bolted to the pile. The attached gages are connected to a Pile Driving Analyzer (PDA) either wirelessly or by a main cable. Rather than a hammer, a drop weight system is used to impact the piles. With each impact, the PDA processes the strain and acceleration measurements in real time, providing both graphical data displays and numerical results. The GRL engineer evaluates the graphical and numerical results during the test. Driving stresses are compared to both the pile material and project specification limits. If driving stresses are high or if a significant potential for pile damage is indicated, driving can be stopped and an alternative installation procedure assessed. The soil resistance magnitude and its distribution can be evaluated during driving with iCAP®, or after data collection with the more rigorous CAPWAP® program. The GRL engineer then provides recommendations for pile installation.

Data Analysis and Reporting

The PDA records the force and velocity for each impact. CAPWAP® analysis is used to assess each impact on the pile. Following data collection, GRL typically processes the estimate loads versus settlement curves. This information is then compared to the prior estimated results. The GRL engineer prepares a final report summarizing the dynamic pile monitoring test details, test results, and recommendations.

Benefits of Testing

- **Dynamic Pile Monitoring helps achieve a safe and economical driven pile installation by assessing pile capacity, driving stresses, integrity, and hammer performance in real time**
- **Dynamic testing provides a fast, reliable and cost effective method for evaluation of driven pile capacity**
- **Time dependent changes in capacity (soil setup, relaxation) can be evaluated by dynamic testing during initial driving and restrrike**

GRL Engineers, Inc.

Corporate Office
Ohio

Office Locations

California	Hawaii	North Carolina	Washington
Colorado	Illinois	Pennsylvania	
Florida	Louisiana	Texas	

